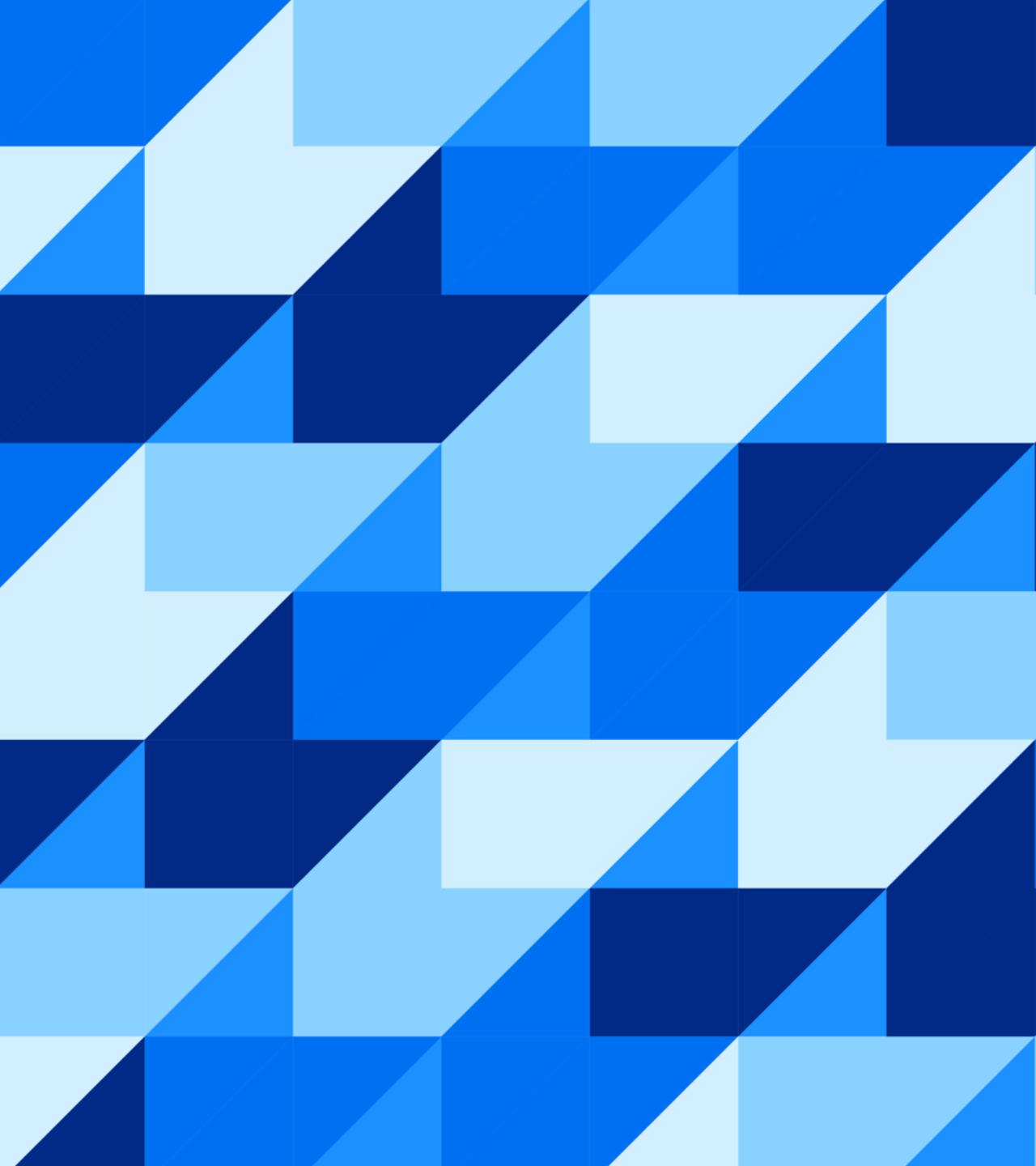


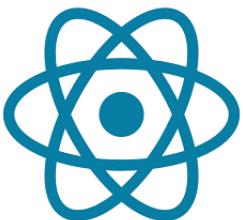
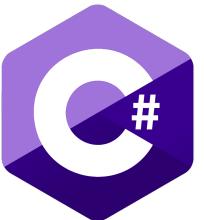
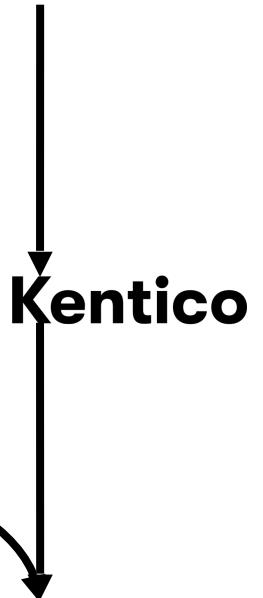
Accessible by Design

Building the Web for Everyone

Michal Kozubík, SAP
Development Expert
July 01, 2025



About me



What is accessibility?



What is accessibility?

What is NOT accessibility?

Accessibility is not – ability to access something



Accessibility is not – axe's ability



The art of combat using two-handed weapons, such as greatswords, battle axes, and warhammers. Those trained in this skill deliver deadlier blows.

Accessibility might be – using axe to control the PC



Accessibility should NOT be

- Just „for blind users“
- Optional, if you care about users
 - (and about business)

What is accessibility?

Accessibility

- Covers visual, auditory, motor and other disabilities
- Covers temporary disabilities
 - Broken arm, lost glasses
- Covers situational limitations
 - Bright sunlight, noisy room (captions)
- It's shared responsibility – UX, dev, testing...
- Is part of EU legislation standards
- [Web Accessibility Perspectives – W3C](#) (YouTube)

WHY Accessibility?

- It's simply the right approach
- Huge market potential (more details later)
- It's already AFTER 28.6.2025
 - [European Accessibility Act](#)
 - Websites and e-shops selling products or services online
 - Mobile apps
 - Electronic devices and technologies – ATMs, payment terminal, smartphones...
 - Making the web a better place for everyone, regardless of their abilities

Accessible UX Examples

Accessible UX – don't rely on same screen size

- User must always have a way to access the full information

The screenshot shows a user interface for managing processes. At the top, there are statistics: "595.5m total cases" and "7.6b total events". Below this is a search bar with the placeholder "very long" and a "Create" button. A dropdown arrow icon is positioned above the table header. The table has columns for "Name", "Investigations", "Dashboards", "Cases", "Events", and "Last edited". There are two rows of data:

Name	Investigations	Dashboards	Cases	Events	Last edited
mk_tm with a very long name that will be truncated (or maybe not - but most probably yes, as it contains a lot of let...)	0	0	877	5k	09/08/2023
Test with a very long name that includes numbers 21302141041501	0	0	0	0	05/23/2024

A tooltip is visible over the second process row, displaying the full name: "mk_tm with a very long name that will be truncated (or maybe not - but most probably yes, as it contains a lot of letters, much more than standard process)".

Accessible UX – don't rely on “obvious” stuff

- Not everyone understands the site/app the same way as you

Email



Email

e.g princess@gmail.com



Label

Wrong Placeholder color value



Label

Correct Placeholder color value



Accessible UX – make it easy for the user

- Proper font size
 - Headers, sub headers, paragraphs
- [Right color contrast](#)

Good contrast

Bad contrast

Accessible UX – don't rely on user's ability

- “2FA” – 2 factor accessibility
- Quiz – how many colors you see?

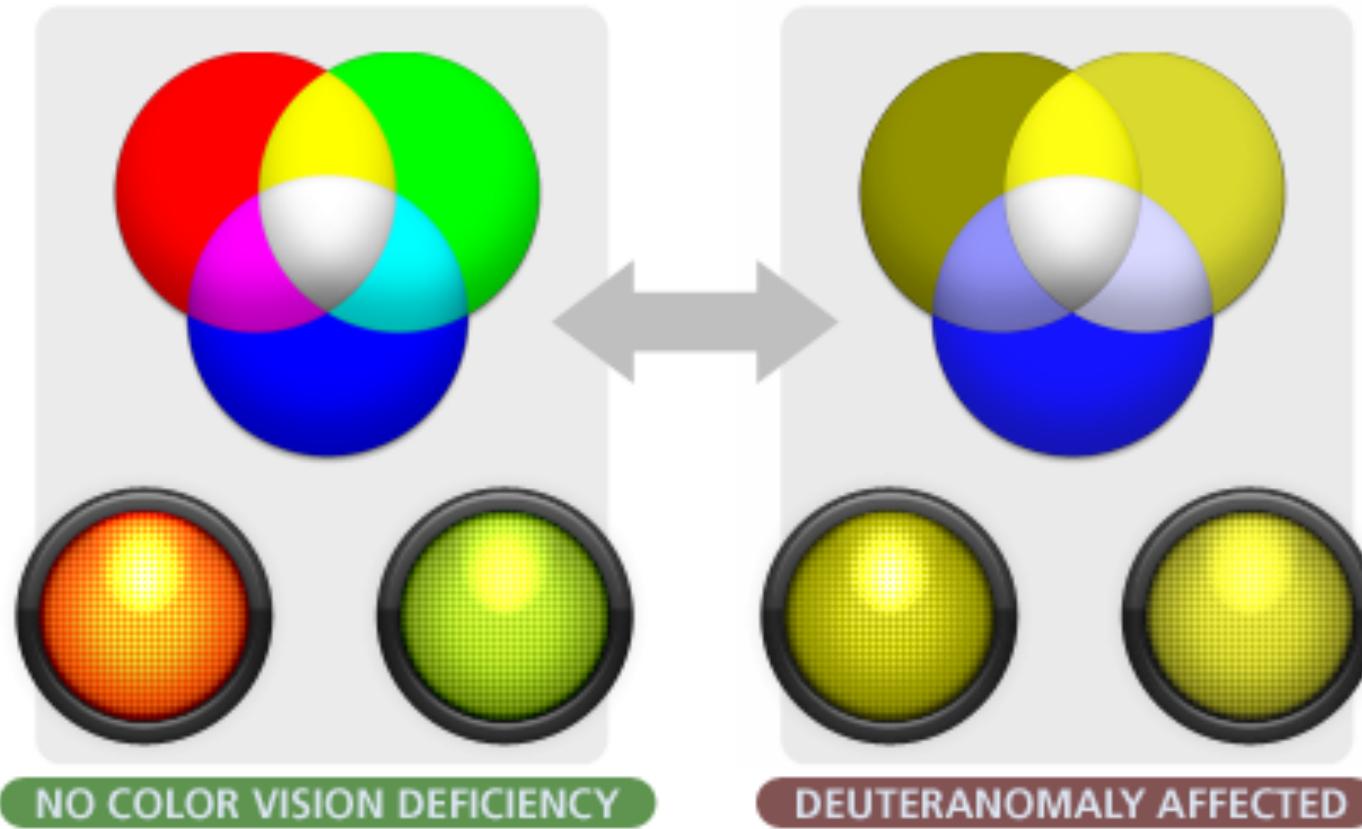


Status: Error



Status: OK

Accessible UX – don't rely on user's ability



The RGB color model and two typical warning LEDs, how most people (ca. 85 % of population) would perceive them.

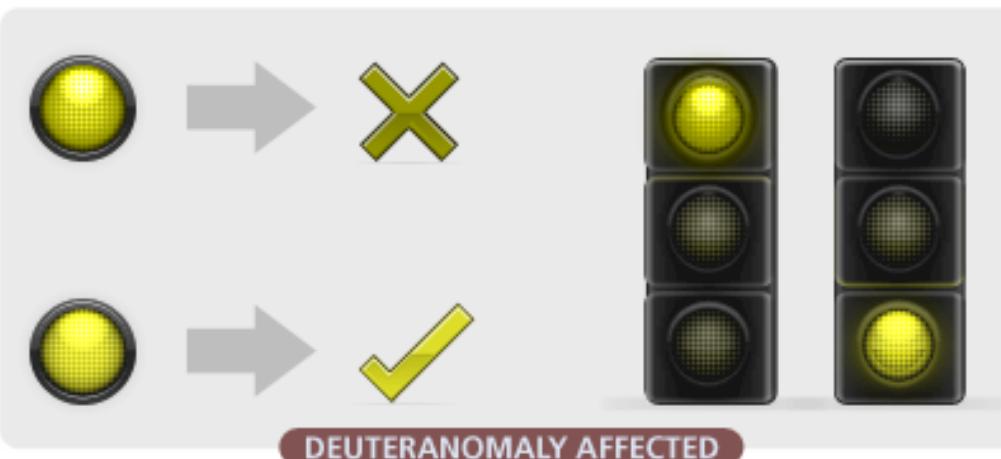
The same objects as left hand, how "green weak" people (ca. 6% of population) would perceive them.

Accessible UX – don't rely on user's ability



Instead of relying on the color as only distinctive feature, the shape of the icons can contain further information.

The position of the highlighted lamps serves as additional hint: The concept of traffic lights is well-known.



Accessible UX – don't rely on user's ability

- What blind people see:

Accessible UX

- because not everyone can see the teeth



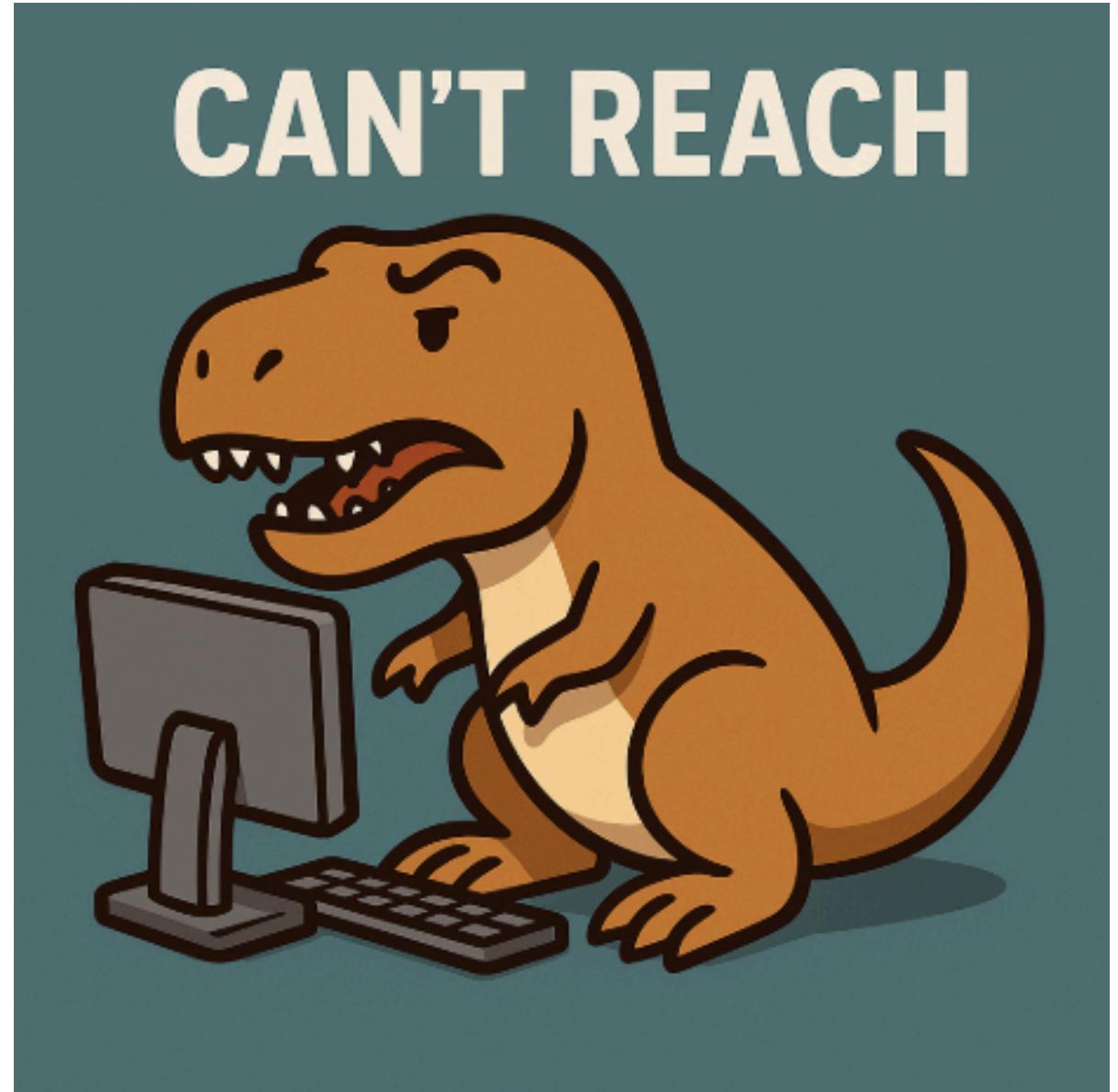
Accessible UI Testing

Accessible UI testing

- Manual testing
 - Keyboard
 - Mouse
 - Screen Readers
 - ChromeVox
 - VoiceOver (MacOS)
- Automated testing
 - Lighthouse
 - axe-core
 - Cypress-axe
 - Jest-axe
 - Playwright-axe
 - Cypress Accessibility

Accessible UI testing

- T-Rex testing
 - Voice Control
 - Sip-and-puff
 - Eye Tracking
 - Head Tracking



For best results

test your app directly with people with a
specific disability and share these results
with the team

Because...

green test result does not mean the web
is accessible for a human



DEMO TIME

[https://developer.mozilla.org/en-US/docs/
Learn web development/Core/Accessibility/
HTML](https://developer.mozilla.org/en-US/docs/Learn/web_development/Core/Accessibility/HTML)

Numbers



1.3 billion

1.3 billion

people experience significant disability
(however, the right approach can affect many more people)

62 %

62 %

people with disability own a desktop or a laptop

72 %

72 %

people with disability own a smartphone

\$13 trillion

\$13 trillion
estimated global spending power of people with
disabilities (and their families)

51

51

errors per page in average found on the home
pages for the top **1,000,000** web sites

96%

96%
of all errors detected fall into **six** categories

Accessibility Statistics

Home pages with most common WCAG 2 failures

WCAG Failure Type	% of home pages
Low contrast text	79.1%
Missing alternative text for images	55.5%
Missing form input labels	48.2%
Empty links	45.4%
Empty buttons	29.6%
Missing document language	15.8%

Standards and guidelines

Standards and guidelines

- [European Accessibility Act](#)
 - Both public and **private sectors**
 - But there are exceptions...
 - WCAG 2.1 level A + AA is mandatory
- [WCAG 2 Overview](#)
- [MDN: Accessibility](#)
- [WCAG in Plain English](#)

WCAG in Plain English

Making accessibility standards easy to understand, one success criterion at a time.

Friendly reminder: This is a beginner-friendly guide, not a replacement for the official WCAG. [See our full disclaimer.](#)

Search articles

 Search

Perceivable Text Alternatives

WCAG 2.0, 2.1, 2.2 | Level A

1.1.1 Non-text Content

Images must have descriptive alternative text.



Code and Labels, Sensory, Wording



Auditory/Hearing, Cognitive, Visual



Code, Content

[View Details](#)

Perceivable Time-based Media

WCAG 2.0, 2.1, 2.2 | Level A

1.2.1 Audio-only and Video-only (Pre-recorded)

Any audio-only content must also be conveyed in text. Any video content with no audio track must also be described in text, but could also be described with audio.



Sensory, Wording



Auditory/Hearing



Content

[View Details](#)

a11y test automation

a11y test automation – verbose approach

- Pros
 - Explicit testing of every element
 - No need for additional libraries
 - Available in Jest, cypress...
- Cons
 - Explicit testing of every element
 - Easy to miss something
 - A lot of code
 - Can increase test complexity
 - Can increase test run time
 - Single failure = end of test

```
// explicitly check the alt text of an image
cy.get('img[data-cy="logo"]').should('have.attr', 'alt', 'Cypress Logo')
```

a11y test automation – verbose approach

Asserting the accessible name of a button

A similar accessibility-minded locator technique can be used with interactive elements like buttons:

```
// click the "Submit" button located by `cy.contains()`  
cy.contains('button', 'Submit').click()
```

And using the Testing Library `ByRole` locator:

```
// click any element with role `button` and an accessible name of `Submit`  
cy.findByRole('button', { name: 'Submit' }).click()
```

a11y test automation – axe approach

- Pros
 - Automatic testing of every element
 - Easy integration
 - Open source
 - Covering a lot of standards
 - Configurable
 - Whole report after test end
- Cons
 - Automatic testing of every element
 - But this can be configured
 - Can increase test complexity
 - Can increase test run time
 - Need to call it multiple times to cover different states

```
it("Should have no accessibility violations on good.html", () => {
  cy.visit("/good.html");
  cy.injectAxe();
  cy.checkA11y();
});
```

a11y test automation – Cypress Accessibility

- Pros
 - No configuration
 - Using axe under the hood
 - Testing all app states
 - No performance impact
 - Snapshots
 - Run comparison
 - ...
- Cons
 - Only available in Cypress Cloud
 - Paid service
 - A lot of info at once
 - Can be confusing

a11y test automation – Cypress Accessibility

Cypress Accessibility Early Access

92% 1k 774 0 Failed rules 16

Submit feedback How Accessibility works

Views 11 Rules 88 Filter rules

Rules ↑

Elements must meet minimum color contrast ratio thresholds Serious 86 721 0

 elements must be contained in a or Serious 713 0 0

Images must have alternate text Critical 269 0 0

Views	Snapshots	Score	Elements	Failed rules
/	257	89%	862 459 0	14
/contacts	69	86%	762 356 0	13
/personal	91	86%	873 482 0	13
/transaction/*	67	87%	19 26 0	7
/transaction/new	94	92%	20 31 0	7
/bankaccounts	24	95%	10 25 0	6
/bankaccounts/new	63	92%	12 12 0	6
/user/settings	62	92%	14 16 0	6

Buttons must have discernible text 1 element

Ensures buttons have discernible text Learn more

.MuilconButton-colorPrimary

One of these must be fixed:

- Element does not have inner text that is visible to screen readers
- aria-label attribute does not exist or is empty

Elements must only use permitted ARIA attributes 2 elements

Ensures ARIA attributes are not prohibited for an element's role Learn more

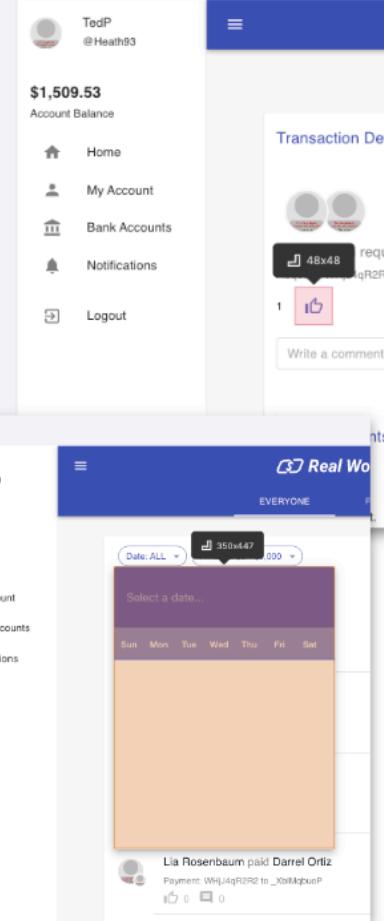
.Cal__Container__root

Inconclusive result aria-label attribute is not well supported on a div with no valid role attribute.

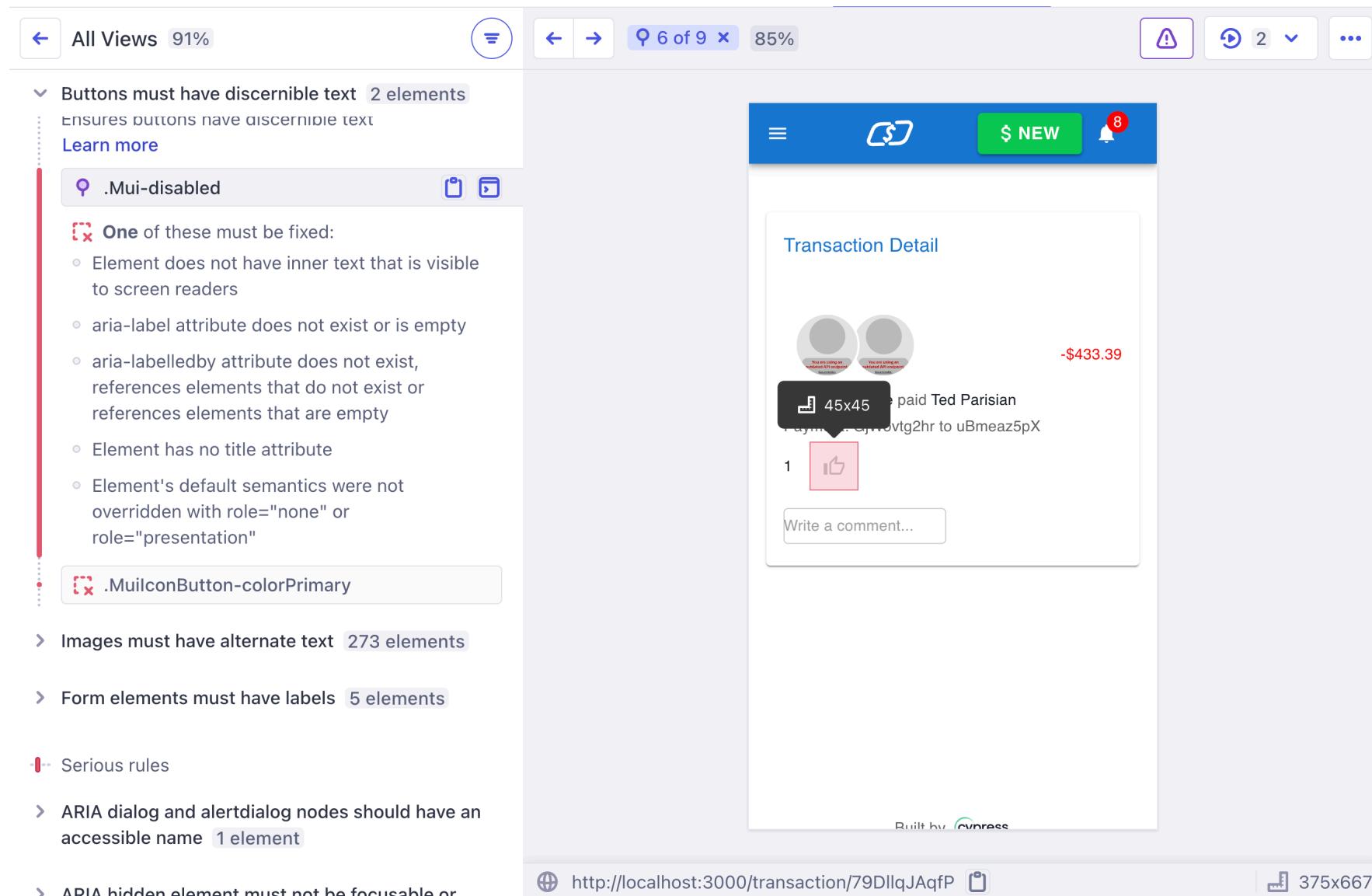
.Cal__Header__wrapper

Page must have means to bypass repeated blocks 1 element

Elements must meet minimum color



a11y test automation – Cypress Accessibility



The screenshot shows the Cypress UI Test Results interface. On the left, a sidebar lists accessibility rules and their violations:

- Buttons must have discernible text** (2 elements):
 - Ensures buttons have discernible text
 - [Learn more](#)
- .Mui-disabled**:
 - One of these must be fixed:
 - Element does not have inner text that is visible to screen readers
 - aria-label attribute does not exist or is empty
 - aria-labelledby attribute does not exist, references elements that do not exist or references elements that are empty
 - Element has no title attribute
 - Element's default semantics were not overridden with role="none" or role="presentation"
- .MuilconButton-colorPrimary**:
 - One of these must be fixed:
- Images must have alternate text** (273 elements)
- Form elements must have labels** (5 elements)
- Serious rules**
- ARIA dialog and alertdialog nodes should have an accessible name** (1 element)
- ARIA hidden element must not be focusable or**

On the right, the transaction detail page is displayed with several accessibility issues highlighted by red boxes and error icons. The page includes a header with a dollar sign icon, a green "NEW" button, and a notification bell with 8 notifications. The transaction detail section shows a payment from "You are using an anonymous account" to "Ted Parisian" for -\$433.39. A comment input field is at the bottom.

Bottom status bar: Built by  http://localhost:3000/transaction/79DlqJAqfP  375x667

Cypress Real-World App

Accessible UI Development

Accessible UI development – HTML First, ARIA Second

- Start as soon as possible
- Use semantic HTML whenever possible
- [MDN – HTML: A good basis for accessibility](#)
- Useful attributes
 - aria-label, aria-describedby, role, tabindex, alt
- Keyboard control
- Screen reader support
- KISS is your friend
- Multiple ways to control the application
 - Problem: Drag & Drop

Key takeaways

- Accessibility should be part of the process from the very beginning
- Mandatory for (almost) everyone since 06/2025
- Native HTML first
- MFA – Multi-Factor Accessibility (color + text + sound...)
- Full keyboard navigation support
- Include people with disabilities into testing
- Automate a11y tests
- **Accessibility means giving everyone a chance to use your awesome product**

Useful resources

- UX
 - [Centigrade: Regarding Color Vision Deficiency in the Icon Design Process](#)
- Dev + testing
 - [MDN: Accessibility on the web](#)
 - [Cypress: Accessibility testing](#)
 - [Cypress Accessibility Demo](#)
- Standards + legislative
 - [Web Content Accessibility Guidelines \(WCAG\) 2.1](#)
 - [EN 301 549 \(EU: Web Accessibility Directive\)](#)
 - [Zákon č. 99/2019 Sb. – Zákon o přístupnosti internetových stránek a mobilních aplikací](#)

PR time

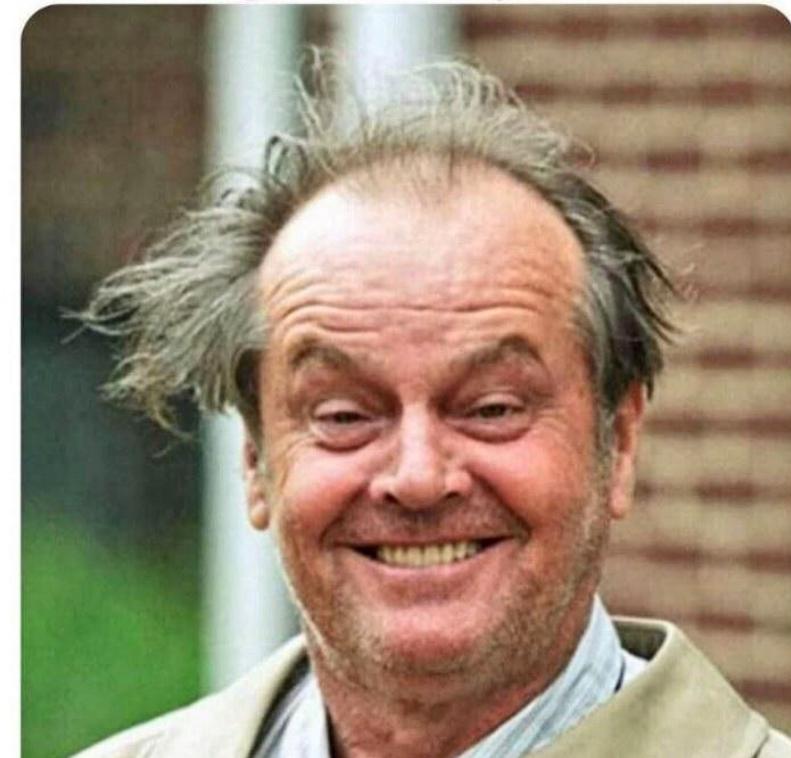
"SAP is not stressful at all."

George, 25 years old



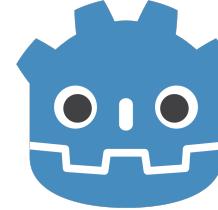
"SAP is amazing,
I am loving it."

John, 2 years experience



Better PR time

- Michal recently started learning Godot Game Engine
- Michal would like to release his own game, but he can't do it alone 😞
- Michal can code, but Michal can't do graphics (or any kind of visually appealing stuff)



- Michal is not looking for employees (because he can't pay them), but for creative partners!
- Join Michal, if you want a better life (jk, you'll have no life but you can pet his dogs)!

Thank you.

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